

# AMENDMENT NO. 1 NOVEMBER 2020

TO

## IS 10617 : 2018 HERMETIC COMPRESSORS — SPECIFICATION

( *Second Revision* )

(Page 5, clause **6.1.2.1**, sentence 2) — Substitute the following for the existing sentence:

‘This is applicable to single phase induction motor compressors only.’

(Page 5, clause **6.1.2.4**, sentence 2) — Substitute ‘The compressor shall start and run at the minimum of the voltage range defined by the compressor specification.’ *for* ‘The compressor shall start and run at minimum voltage, as per the compressor specification’.

(Page 5, clause **6.1.3**, sentence 3) — Substitute ‘The compressor shall be charged with oil and if necessary, vapor refrigerant’ *for* ‘The compressor shall be charged with oil, if necessary, and vapour refrigerant.’

(Page 6, clause **6.1.4**) — Substitute ‘The compressor shall be able to withstand min 1.5 kV AC voltage for 1 s without breakdown’ *for* ‘The compressor shall be able to withstand 1.5 kV AC voltage for 1 min/s without breakdown’.

(Page 6, clause **6.1.6**) — Delete.

(Page 6, clause **6.1.7**, para 1) — Substitute the following for the existing para:

‘Housings shall withstand the pressure expected in normal use. Housing shall be subjected to low side pressure or high side pressure or both pressure in normal use as per the design of hermetic compressors. The evaluation shall be carried out determining which part of the shell is subjected to high or low side or both

**Price Group 2**

pressures as per the compressor design. Wherever needed, specially built samples with or without assembly inside are subjected to this test, the high pressure side shell or portion of shell is to be subjected to high side test pressure and low pressure side shell or portion of shell is to be subjected to low side test pressure.’

(Page 6, clause 6.2) — Substitute ‘as per the manufacturer’s specification’ for ‘as per the mutual agreement between the supplier and the buyer’.

[Page 6, clause 6.3, a)] — Substitute ‘High voltage test at minimum 1.5 kV and 5 mA leakage current for 1s’ for ‘High voltage test at 1.5 kV and 5 mA leakage current for 1s’.

[Page 6, clause 6.3, b)] — Delete.

[Page 6, clause 6.3, c)] — Substitute ‘The housing shall be tested pneumatically (dry air/nitrogen/helium) at a test pressure of minimum 1Mpa (gauge) and shall not show any leakage’ for ‘The housing shall be tested pneumatically (dry air/nitrogen/helium) at a test pressure of 1MPa (gauge) and shall not show any leakage.’

(Page 7, Table 7 and 8) — Insert the following note under the table:

‘NOTE — For the refrigerants not mentioned in the table, test pressure as per IS/ISO 17584 is to be used. For refrigerants not mentioned in either the table or IS/ISO 17584, refrigerant manufacturer’s data sheet is to be referred for the test pressure.’

(Page 8, clause 7) — Substitute the following for the existing:

‘The compressor shall have built in protection system. It may be bi-metallic thermal overload protection or electronically controlled protection system. The protection system can be either internal to the compressor or placed externally. The compressor shall be capable of withstanding the overload test on calorimeter/ test bench tests as given in Table 9.

The motor-compressor including the motor-compressor protection system or motor-compressor control system, if any, is operated under the appropriate conditions given in Table 9 so as to cause the motor-compressor protection system to operate or to reach steady conditions with the motor-compressor in the stalled or running condition. The testing shall be conducted at rated voltage and stabilized for 2 h.

After stabilization, the test voltage shall be increased to 1.06 times of rated voltage to stabilize and the motor protection system shall not trip. In case of dual rated voltage, highest voltage is to be considered as the test voltage.

The test is then repeated with voltage reduced to 0.94 times of rated voltage and 0.85 times of rated voltage. In case of dual rated voltage, lowest voltage is to be considered as the test voltage.

During test, if the motor-compressor protection system does not operate, the voltage is decreased (or increased in case the protector trips at 0.85 times rated voltage to find the start voltage) in steps of 4 percent  $\pm$  1 percent of the rated voltage, at a rate of approximately 2 V/min, until steady conditions are reached at each step. This procedure is continued until one of the following conditions occurs:

- a) the motor-compressor protection system operates; or
- b) the motor-compressor stalls and steady conditions are reached.

NOTE — Stabilized conditions are considered to be obtained when three successive readings of the temperature, taken at approximately 10 min intervals, at the same point of any operating cycle, does not differ by more than -273°C (1 K).

At the time of trip, the winding temperature shall not exceed 150°C for compressors with cellulosic insulation and 160°C for compressors with synthetic insulation. For other insulating material winding temperature limit may be defined by the manufacturer. This test is not applicable to variable speed and DC compressors.

NOTES:

**1** For single phase (induction motor) compressor, motor protector is connected in series with the common winding. When the protector trips, since individual resistance measurement is not possible, resistance shall be measured across start and run winding connections that is, combined winding resistance. This combined winding resistance shall be used for calculating winding temperature.

**2** For 3 phase (induction motor) compressor the protector is connected in the star connection of the winding. Considering this, winding resistance measurement after protector trips is not possible. Hence, winding resistance shall be measured as below:

- i) Run the compressor at the voltage just before the protector trip to achieve steady state condition; and
- ii) Shut down the power supply to the compressor to measure the winding resistance. The winding temp is calculated on the basis of this winding resistance.'

(Page 8, clause **8.1**, sentence 4) — Substitute 'The compressor shall be charged with oil and if necessary, vapor refrigerant.' for 'The compressor shall be charged with oil, if necessary, and vapour refrigerant.'

(Page 8, clause **8.1**) — Insert the following note at the end of clause:

'NOTE — Locked rotor test required on all compressor type which have auto reset protection system (including electronic protection system when provided with the compressor).'

(Page 9, clause 9) — Substitute the following for the existing:  
‘Resistance to rusting shall be as per Annex B’.

(Page 11, ANNEX A) — Insert the following new Annex:

**‘ANNEX B**  
**RESISTANCE TO RUSTING**  
( Clause 9 )

**B-1 GENERAL GUIDELINES**

This specification governs the inspection and testing procedures of paint and or rust preventive coating applied on compressor shell.

All surfaces shall be completely painted. Carry out the test at a temperature of  $(25 \pm 5)$  °C and a relative humidity of below 80 percent, unless otherwise agreed.

Wet dip painted items must have three (3) to five (5) days curing time before testing. Powder painted items are cured when cooled.

Manufacturer’s can either refer to the test methods given in **B-2** or refer to the ISO methods as below:

<i>Sl No.</i>	<i>Property / Evaluation</i>	<i>ISO Method</i>
(1)	(2)	(3)
i)	Dry film thickness	ISO 2808 : 2019
ii)	Paint adhesion by cross cut test	ISO 2409 : 2020
iii)	Paint cure test	ISO 2808 : 2019

**B-2 TEST METHODS**

**B-2.1 Dry Film Thickness Test**

The paint thickness will be measured by means of a dry film thickness gauge. Several measurements will be taken on various locations on the sample. As a minimum requirement following locations are to be covered:

- a) Two locations each on the shell front, back and 2 sides; and
- b) One location each on top, bottom of shell and on the mounting bracket or legs.

An average value for the entire sample will be recorded as the paint thickness. This average paint thickness measured shall comply with the manufacturer quality control specification.

**B-2.2 Paint Adhesion by Cross Cut Test**

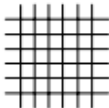
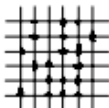
Scribe number of cuts in each direction of the lattice pattern that is, in horizontal and 90 degree direction, minimum cuts shall be six. The cuts shall be parallel lines through the finish to the base metal by use of a carbide-tipped scribe or multi blade scribing tool. The cuts shall be made such that there are definite intersection points between the horizontal and vertical cuts. The lines should be approximately as follows:

- a) up to 60  $\mu\text{m}$ : 1 mm (minimum) spacing, for hard (e.g. metal and plastics) substrates;
- b) 61  $\mu\text{m}$  to 120  $\mu\text{m}$ : 2 mm (minimum) spacing, for both hard and soft substrates; and
- c) 121  $\mu\text{m}$  to 250  $\mu\text{m}$ : 3 mm (minimum) spacing, for both hard and soft substrates.

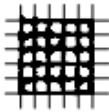
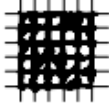
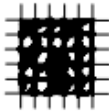
The length of the lattice/ square thus produced may be 50 mm or as derived by the manufacturer’s specification.

Press a strip of scotch brand #600 tape or equivalent having same surface energy over the scribed area. Remove the tape rapidly. The removal of more than 15 percent of squares will be cause for rejection of the sample due to poor paint adhesion. Table 10 shows the six-step classification of cross-cut test result.

**Table 10 Classification of Test Results**  
( Clause B-2.2 )

SI No.	Classification	Description	Appearance of surface of cross-cut area from which flaking has occurred <sup>1)</sup> ( Example of six parallel cuts )
(1)	(2)	(3)	(4)
i)	0	The edges of the cuts are completely smooth; none of the squares of the lattice is detached.	
ii)	1	Detachment of small flakes of the coating at the inter-sections of the cuts. A cross-cut area not greater than 5% is affected.	

**Table 10 ( Concluded )**

Sl No.	Classification	Description	Appearance of surface of cross-cut area from which flaking has occurred <sup>1)</sup> ( Example of six parallel cuts )
(1)	(2)	(3)	(4)
iii)	2	The coating has flaked along the edges and/or at the intersections of the cuts. A cross-cut area greater than 5%, but not greater than 15%, is affected.	
iv)	3	The coating has flaked along the edges of the cuts partly or wholly in large ribbons, and/or it has flaked partly or wholly on different part of the squares. A cross-cut area greater than 15%, but not greater than 35%, is affected.	
v)	4	The coating has flaked along the edges of the cuts in large ribbons and/or some squares have detached partly or wholly. A cross-cut area greater than 35%, but not greater than 65%, is affected.	
vi)	5	Any degree of flaking that cannot even be classified by classification 4.	—

<sup>1)</sup> The figures are examples of cross-cut within each step of the classification. The percentages stated are based on the visual impression given by the pictures and the same percentages will not necessary be reproduced with digital imaging.

### **B-2.3 Paint Cure Test**

Paint cure shall be tested as follows in the area of the shell where the greatest heat sink or thermal mass is located:

- a) Measure the paint film thickness in the area to be tested and record this reading as the initial paint thickness;
- b) Saturate a small area of a Kim wipe, cheesecloth, or similar white material with the appropriate solvent for the paint being tested:
  - 1) Epoxy powder paint — Methyl Ethyl Ketone (MEK) or Acetone

- 2) Alkyd enamel dip paint — Methyl Ethyl Ketone (MEK) or Acetone
- 3) Hybrid polyester/epoxy powder — Xylene
- c) Rub the paint surface with the solvent soaked cloth for 25 double rubs;
- d) Inspect the surface of the material for paint. Record your observations (that is, no paint, slight amount of paint, moderate paint residue, and heavy paint residue); and
- e) Measure the paint film thickness after the solvent rub and record this as the final paint film thickness. The loss more than 15 percent, based on an average of 5 measurements after 25 double rubs, will constitute a cure failure.’